IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellants:	Marc LIEVEN	Examiner: BITAR, NANCY
Serial No.:	10/568,350	Group Art Unit: 2624
Filed:	OCTOBER 23, 2006	Confirmation No.: 2658

Title: **ASPARTOACYLASE GENE, PROTEIN, AND METHODS OF SCREENING FOR MUTATIONS ASSOCIATED WITH CANAVAN DISEASE**

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

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Sir:

Further to the Notice of Appeal filed December 10, 2009, attached herewith is Appellants' Brief on Appeal, pursuant to 37 CFR §41.20(b)(2). A petition to charge the requisite fee for the five-month extension of time associated with this brief is enclosed herewith.

This is an appeal from the decision of the Examiner finally rejecting claims 1-17 and 19-21 of the above-identified application. The final rejection was mailed on June 10, 2009.

(I) REAL PARTY IN INTEREST

SICAT GMBH & CO. KG is the Assignee of Record of the entire right, title, and interest in and to the above-identified application, as recorded in the U.S. Patent and Trademark Office on October 23, 2006, at Reel/Frame 018477/0534.

(II) RELATED APPEALS AND INTERFERENCES

Appellants, their legal representative and the assignee are not aware of any related appeals or interferences which will directly affect or be directly affected by

or have a bearing on the Board's decision in the instant appeal.

(III) STATUS OF THE CLAIMS

Claims rejected:	Claims 1-17 and 19-21.
Claims allowed:	(none)
Claims canceled:	Claim 18
Claims withdrawn:	(none)
Claims on Appeal:	Claims 1-17 and 19-21 (Copy of claims on appeal in attached Appendix).

(IV) STATUS OF AMENDMENTS

The amendments presented with the Reply of March 12, 2009 (to the non-final Office Action of December 12, 2008) are entered and are reflected in the claims on appeal shown in the attached Appendix of Claims.

(V) SUMMARY OF CLAIMED SUBJECT MATTER

One aspect of Appellants' invention (independent **claim 1**) is directed to a method for presenting image data (1) that represents a three-dimensional object (7) in a space, comprising generating projection data which represents a two-dimensional projection (6) of the object (7) by computationally superimposing multiple image planes, and displaying the projection (6) on a monitor for viewing by a user, wherein a sub-area (8) is selected from the projection (6) and a detail image (9) having different information content than the projection (6) is generated inside the sub-area (8), and displaying the detail image (9) within the sub-area (8) on the monitor. See, for example, page 1, ¶1 and original claim 1. See also, the disclosure contained in Fig. 1.

Claims 2-15, 20 and 21 directly or indirectly depend on the aforementioned claim 1 and recite further aspects of the method(s) claimed therein. To this end **claim 2** is directed to a method for presenting image data (1) that represents a three-dimensional object (7) in a space, wherein the detail image is generated in direct or indirect recourse to the image data (1) from which the projection is generated and

this image data (1) is collected in a first data record. See, for example, the paragraph bridging pages 5 and 6 of the original specification. **Claim 3** further recites that a user selects one of several possible detail images (9) which differ in their information content. **Claim 20**, which depends on aforementioned claim 3, recites that the information content is the depth, or perspective, or type of display or the depth of information represented by the detail image. See, for example, the paragraph bridging pages 4 and 5 for support of claims 3 and 20. **Claim 4** further recites that detail image (9) is a sub-projection (10) which differs from the projection (6) in that the depth of field is greater. See, for example, the paragraph bridging pages 4 and 5 of the original specification for support. **Claim 5**, which is dependent on instant claim 4, further recites that the plane (4) of the sub-projections (10) is parallel to the plane of the projection (6). See, for example, the 1st complete paragraph at page 5 of the original specification. Claim 6 is directed to a method for presenting image data (1) that represents a three-dimensional object (7) in a space, wherein a separate window is opened on the monitor, in which various sections are displayed by the object (7) within the frame of the selected sub-area (8). See, for example, the 1st complete paragraph at page 6 of the original specification. **Claim 7** recites that a volume presentation or a surface display is made in the separate window. See page 6 of the original specification for support. **Claim 8** recites that fewer image planes (4) are superimposed when sub-projections (10) with higher depth of field are generated than when projections (6) are generated. **Claim 9** recites that exactly one image plane (4) represents a sub-projection (10). See page 5, paragraph 1 and original claim 8 for support of claims 8 and 9. See also the disclosure contained in Fig. 3. **Claim 10** recites that the user has interactive access to the image information in the sub-area (8) by moving a pointer instrument to scroll among different layers parallel to the projection planes. See, for example, the penultimate paragraph at page 4 of the original specification for support. **Claim 11** recites that the image data represents a part of a human or animal body and is recorded with a diagnostic system. See, for example, the 2nd complete paragraph at page 6 of the original specification for support. **Claim 12**, which is dependent on instant claim 11, recites that the image data is recorded with a computer tomograph (CT), a magnetic resonance tomograph

(MR), or by digital volume tomography (DVT). See, for example, the 1st complete paragraph at page 7 of the originally-filed specification. **Claim 13**, which is also dependent on claim 11, recites that the image data is recorded with a C-arch, which is rotated around the object. See, for example, page 6, lines 26-31 of the original specification and the disclosure contained in Fig. 3. **Claim 14** recites that the detail image is generated with direct or indirect recourse to the image data, which is collected in a second data record, wherein this image data originates from another recording of the object. See, for example, the disclosure in the Abstract and original claim 14. **Claim 15**, which is dependent on aforementioned claim 14, recites that the image data of the second data record is recorded with another device, at another time, or with different device parameters. See, for example, page 5, lines 29–33 for support. **Claim 21** recites that the image data represents dental images. See, for example, original claim 18 and Fig. 3 of original disclosure.

A related aspect of Appellants' invention (independent **claim 16**) is directed to a system for image presentation which comprises a computer with access to image data (1) that represents a three-dimensional object (7) in space a computer readable medium comprising a program which extracts multiple cross-sectional images in different planes from the image data and superimposes them to form a two-dimensional projection (6) of the object, a monitor on which the projection (6) can be displayed, and a computer readable medium comprising a program for selecting a sub-area (8) within the projection (6), which can also be displayed on the monitor, wherein the program includes a function that generates a detail image (9) via indirect or direct recourse to the image data (1), wherein the detail image (9) has different information content than the projection (6) and is displayed on the monitor inside the sub-area (8). See, for example, the last complete paragraph at page 2 and original claim 16.

Claims 17 and 19 are directly dependent on aforementioned independent claim 16. To this end, **claim 17** is directed to systems of the instant invention comprising means for selecting a detail image (9) from a plurality of images. See, for example, the disclosure contained in the Examples at page 8 of the original specification. **Claim 19** recites that the means is a mouse, a trackball or a joystick.

See, for example, the disclosure contained in, for example, page 4, lines 8–12 of the original specification for support.

(VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Appellants request a review of the following remaining grounds of rejection. For each ground, any separate grouping of the claims subject to that rejection is indicated.

(1) The rejection of claims 1-13, 16, 17 and 19-21 under 35 U.S.C. §103(a) as allegedly being unpatentable over Delegacz (*Image display and Visualization*, 2000) in view of Cheng-Sheng (*Proc. of Real-Time and Media Systems*, 1998). Claims 14 and 15 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over the aforementioned Delegacz and Cheng-Sheng references further in view of Engel (*Proceedings Visualization*, 2000).

Grouping of claims

Claims 1, 3-17 and 19-21, on appeal, are grouped together with respect to the outstanding rejection under 35 U.S.C. §103(a). These claims stand or fall together with independent claim 1.

Claim 2, on appeal, stands or falls independently of claim 1.

(VII) ARGUMENT

Rejection under 35 U.S.C. §103(a)

Claims 1-13, 16, 17 and 19-21 are rejected under §103(a) as allegedly being unpatentable over Delegacz et al. in view of Cheng-Sheng et al. Claims 14 and 15 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over the aforementioned Delegacz and Cheng-Sheng references further in view of Engel et al. These rejections are not supported by the record as a whole and should be reversed.

Delegacz describes creation of a 3D visualization system to aid physicians in observing abnormalities of the human lung. The reference only teaches or suggests a method for 3D-visualisation of a lung using 2D-lung slices by CT. See, the entire ABSTRACT section. These lung slices run through a segmentation procedure for better

visualization of the lung tissue. The segmented lung slices are used as input for the 3-D-visualisation (see, chapter 4: "Segmentation" and the disclosure in Figures 1-3a). The visualization system presents the user a slice sequence view (see, Figure 4), a view of the lung as a 3D-object by volume rendering (see, Figures 5 and 6) and sliding thin slabs of the 3D-projection (Figures 7 and 8). Further the 3D-visualisation system allows a general look of the lung object by surface rendering or surface and volume rendering (Figures 9 and 10). To render surface and volume data, Delegacz uses a known algorithm called "shear-warp." See, page 402, last paragraph of the article.

Such a combination of surface and volume data is not the claimed 2D projection of a 3D object. Also Delecagz does not show the claimed 2D having sub-areas with access to a 3D database. This aspect is conceded in the paragraph bridging pages 6 and 7 of the Office Action mailed on December 12, 2008, wherein the Examiner states that "Delegacz fails to specifically teach the detailed image is shown on the screen within the subregion." The Office Action then proceeds to contend that the missing claim element is taught by Cheng-Seng et al. Appellants respectfully traverse this contention.

Cheng-Seng describes a simulated surgery of a 3D-image to allow a better view on the resulting image after the cutting operation. See, chapter 2.3 the simulated surgery and the Figure before the "Conclusion" Section of Cheng-Seng et al. It is therein described that the technique involves using a mouse to create several control points on the image and the polygon enclosed by these points is the section that simulates the surgery. Secondly, users must specify the depth to be cut. With this depth, the cut volume will be specified, and all the data in this volume must be removed. But this detail image does not have different information content than the 3D-object. In Cheng-Seng the picture of the 3D-object and the sub-area are based upon the same 3-D-volume data base. Cheng-Seng does not involve the handling of any 2-D-images. Thus, a combination of the above-cited reference would, at most, teach or suggest a method, wherein the sub-area of an image shows an image of the same data quality. In other words, the references at their broadest interpretation teach a 2D-slice image containing a sub-area with another 2-D-slice image or a 3D-image containing a sub-area with another 3D-image, each of which comprise the same

database. Additionally, since Cheng-Seng is directed to accelerated volume rendering of 3D-images, the reference is absolutely silent with regard to projection data which represents a two-dimensional projection, as recited in Appellants' claim 1. Insofar as neither Delegacz nor Cheng-Seng show the claimed projection or provides any hint or suggestion about this feature, a combination of the cited references fail to *prima facie* render obvious the claims of the instant application.

In an embodiment of the instant invention, there is provided a method for presenting image data that represents a three-dimensional object in a space. The method involves not presenting such 3-D data directly, but rather presenting on a monitor projection data which represents a two dimensional projection of the same object. This 2-D projection is not a simple 2-D version in a particular plane, for instance, but rather as stated in the claim, is a computational superimposition of multiple image planes. One can think of an example of such a 2-D projection as the familiar x-ray panorama photograph of an entire patient jaw, typically made by dentists. Such computationally superimposed 2-D images provide professionals such as dentists a good overlook of the entire jaw and are easy to handle. However, of course, in such a 2-D image, detail is lost since the 3-D data set is no longer presented in the image. In accordance with the claimed method, a sub area can be selected from the 2-D projection in which an image with more detail for the sub area is presented while the 2-D overall projection is still present on the monitor. Thus, a kind of image-in-image presentation is involved where the overall 2-D image (superimposition of multiple image planes) is presented and within such image a more detailed image of a sub area is also presented which more detailed image contains different information than the 2-D image itself. As indicated in claim 2, the detailed image is generated from the 3-D image data of the object from which the 2-D projection is generated. The references in no way can be combined to arrive at this method.

Delegacz shows three types of images. In one, 2-D-CT slices are complied into a sequence for achieving a 3-D fly-through effect. In addition, Delegacz shows conventional 3-D-surface rendering images or 3-D volume rendering images. None of these image types is the same as or suggest in any way the 2-D projection recited in

the claims which comprises a computationally superimposed set of multiple image planes. Contrary to the USPTO's assertion at page 3 of the final Office Action mailed June 10, 2009, Delegacz fails to teach or suggest both the 3-D object data set and the 2-D projection data set. The cited secondary reference by Cheng-Sheng is also far removed from the recited 2-D projection image. It shows only the cutting out from a 3-D image of a subsection with the subsection's own 3-D data. Thus the result is the removal from a conventional 3-D image of a portion of that 3-D image, leaving behind a subtraction of the removed 3-D data set from the original total 3-D data set. In other words, a 3-D sub volume is removed from a 3-D volume. This bears no relationship to the claimed method.

As can be seen, no combination of the two references produces the recited features of the method or system whereby a displayed 2-D data set is composed of computationally superimposed multiple images, and within this corresponding image, sub areas are selected for which 3-D images are displayed within the context of the overall 2-D image. This invention provides an interactive detailed image within an overview image where the detailed image can be moved around within the overview to provide detail at a desired sub area.

The examiner's comments regarding zooming in or zooming out in the cited Delegacz reference (see, page 3, lines 3–4 of the final Office Action) are irrelevant because zooming is a completely different functionality from that described above and recited in the claims.

As for the PTO's refusal to give weight to the preamble (see, page 3, lines 11–16 of the final Office Action), such is clearly unjustified. The controlling case law is not represented by the very old decisions cited by the examiner. Rather, the Federal Circuit has summarized the case law on this issue, in, e.g., *Catalina Marketing International v. Coolsavings.com, 62 USPQ2.d 1781 (Fed. Cir. 2002)*. In this case, the Federal Circuit summarizes situations where preambles are to be given weight. Several of these mandate that the preamble must be given weight in the current claims. One of these situations is where there is use of a "preamble phrase for antecedent basis" (at 62 USPQ2.d at 1785). This is true in the situation here where, e.g., the "image data (1) that represents a 3 dimensional object (7) in a

space" is referred to in dependent claims, thereby using it as antecedent basis. See, e.g., claim 2. Moreover, the preamble is to be given weight where it is essential to understand terms used in the claim body (at 61 USPQ2.d 1785) which is clearly the case here where reference to "the object (7)" is made in the body of claim 1 and reference to projections and images all relate to this very same object. Consequently, the preamble of the claim must be given weight. In any event, irrespective of whether the preamble is given weight, the art rejections are unsound.

Therefore, it is respectfully submitted that the instantly claimed subject matter is fully inventive over the cited references and that the Office Action has failed to meet the basic criteria for *prima facie* case of obviousness. As such, the rejection under 35 U.S.C. §103(a) must be withdrawn.

Dependent claims 14 and 15

With respect to the other dependent claims at issue, Appellants will not burden the record with a discussion of same since they merely add to the unobviousness of claim 1. However, Appellants reserve the right to provide rebuttals against the contentions made in the Office Action *vis-à-vis* these dependent claims, at a later date, if ever necessary.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

/Sagun KC/

Sagun KC, Reg. No. L0510
For Appellant(s)

/Anthony J. Zelano/

Anthony J. Zelano, Reg. No. 27,969
Attorney for Appellant(s)

MILLEN, WHITE, ZELANO
& BRANIGAN, P.C.
Arlington Courthouse Plaza 1, Suite 1400
2200 Clarendon Boulevard
Arlington, Virginia 22201
Telephone: (703) 243-6333
Facsimile: (703) 243-6410

Attorney Docket No.: BRAUN-0001

Date: July 12, 2010

(VIII) CLAIMS APPENDIX

Claim 1. A method for presenting image data (1) that represents a three-dimensional object (7) in a space, comprising generating projection data which represents a two-dimensional projection (6) of the object (7) by computationally superimposing multiple image planes, and displaying the projection (6) on a monitor for viewing by a user, wherein a sub-area (8) is selected from the projection (6) and a detail image (9) having different information content than the projection (6) is generated inside the sub-area (8), and displaying the detail image (9) within the sub-area (8) on the monitor.

Claim 2. The method in accordance with claim 1, wherein the detail image is generated in direct or indirect recourse to the image data (1) from which the projection is generated and this image data (1) is collected in a first data record.

Claim 3. The method in accordance with claim 1, further comprising the user selecting one of several possible detail images (9) which differ in their information content.

Claim 4. The method in accordance with claim 1, wherein a detail image (9) is a sub-projection (10) which differs from the projection (6) in that the depth of field is greater.

Claim 5. The method in accordance with claim 4, wherein the plane (4) of the sub-projections (10) is parallel to the plane of the projection (6).

Claim 6. The method in accordance with claim 1, wherein a separate window is opened on the monitor, in which various sections are displayed by the object (7) within the frame of the selected sub-area (8).

Claim 7. The method in accordance with claim 1, wherein a volume presentation or a surface display takes place in the separate window.

Claim 8. The method in accordance with claim 1, wherein fewer image planes (4) are superimposed when sub-projections (10) with higher depth of field are generated than when projections (6) are generated.

Claim 9. The method in accordance with claim 1, wherein exactly one image plane (4) represents a sub-projection (10).

Claim 10. The method in accordance with claim 1, wherein the user has interactive access to the image information in the sub-area (8) by moving a pointer instrument to scroll among different layers parallel to the projection planes.

Claim 11. The method in accordance with claim 1, wherein the image data represents a part of a human or animal body and is recorded with a diagnostic system.

Claim 12. The method in accordance with claim 11, wherein the image data is recorded with a computer tomograph (CT), a magnetic resonance tomograph (MR), or by digital volume tomography (DVT).

Claim 13. The method in accordance with claim 11, wherein the image data is recorded with a C-arch, which is rotated around the object.

Claim 14. The method in accordance with claim 1, wherein the detail image is generated with direct or indirect recourse to the image data, which is collected in a second data record, wherein this image data originates from another recording of the object.

Claim 15. The method in accordance with claim 14, wherein the image data of the second data record is recorded with another device, at another time, or with different device parameters.

Claim 16. A system for image presentation which comprisesa computer with access to image data (1) that represents a three-dimensional object (7) in spacea computer readable medium comprising a program which extracts multiple cross-sectional images in different planes from the image data and superimposes them to form a two-dimensional projection (6) of the object,a monitor on which the projection (6) can be displayed, anda computer readable medium comprising a program for selecting a sub-area (8) within the projection (6), which can also be displayed on the monitor,wherein the program includes a function that generates a detail image (9) via indirect or direct recourse to the image data (1), wherein the detail image (9) has different information content than the projection (6) and is displayed on the monitor inside the sub-area (8).

Claim 17. The system in accordance with claim 16, further comprising means for selecting a detail image (9) from a plurality of such images.

Claim 19. The system according to claim 17, wherein the means is a mouse, a trackball or a joystick.

Claim 20. The method of claim 3 wherein said information content is the depth, or perspective, or type of display or the depth of information represented by the detail image.

Claim 21. The method of claim 1 wherein said image data represents dental images.

(IX) EVIDENCE APPENDIX

Appendix of evidence submitted pursuant to §§ 1.130, 1.131, or 1.132 of this title or of any other evidence entered by the Examiner and relied upon by appellant in the appeal, along with a statement setting forth where in the record that evidence was entered in the record by the Examiner. Copies of the evidentiary documents are attached.

Reference/Exhibits	Entered in the Record
1. DELEGACZ et al. "Three-dimensional visualization system as an aid for lung cancer." *Medical Imaging* 2000, Image Display and Visualization, vol. 3976, 13 Feb 2000, pgs. 401-409.	Filed by Appellants with an IDS of November 2, 2007. Note of consideration made in the Office Action mailed December 10, 2008. Reference was used by the Examiner in levying the rejection under 35 USC §103(a).
2. CHENG-SHENG et al. "Fast volume rendering for medical image data." *Proceedings of Real-Time and Media Systems*, Rams, 31 Dec 1998, pgs. 49-55.	Filed by Appellants with an IDS of November 2, 2007. Note of consideration made in the Office Action mailed December 10, 2008. Reference was used by the Examiner in levying the rejection under 35 USC §103(a).
3. ENGEL et al. "Combining local and remote visualization techniques for interactive volume rendering in medical applications." *Proceedings Visualization* 2000, 8-13 Oct 2000, Salt Lake City, UT, pgs. 449-452.	Filed by Appellants with an IDS of November 2, 2007. Note of consideration made in the Office Action mailed December 10, 2008. Reference was used by the Examiner in levying the rejection under 35 USC §103(a).
4. MOZZO et al. "A new volumetric CT machine for dental imaging based on the cone-beam technique: preliminary results." *European Radiology*, vol. 9 no. 9, 31 Dec 1998, pgs. 1558-1564.	Filed by Appellants with an IDS of November 2, 2007. Note of consideration made in the Office Action mailed December 10, 2008.
5. SHIMURA et al. "Image data acquisition method and image data acquisition device." US patent No. 6,546,068.	Cited by the Examiner in the Office Action mailed December 10, 2008.
6. KAWAI et al. "Computerized tomography system." US patent No. 5,848,114.	Cited by the Examiner in the Office Action mailed December 10, 2008.
7. RUPPERT et al. "Methods for registration of three-dimensional frames to create three dimensional virtual model of objects." US patent No. 7,379,584.	Cited by the Examiner in the final Office Action mailed June 12, 2009.

(X) RELATED PROCEEDINGS APPENDIX

(None)